

On “Inequality in COVID-19 vaccine acceptance and uptake”

Zachary D.V. Abel¹, Laurence S.J. Roope^{1,2} Raymond Duch³, Sophie Cole¹, Philip M. Clarke^{1,2,4}

1. Health Economics Research Centre, Nuffield Department of Population Health, University of Oxford, Oxford OX3 7LF, United Kingdom

2. National Institute for Health Research Oxford Biomedical Research Centre, John Radcliffe Hospital, Oxford OX3 9DU, United Kingdom

3. Nuffield College, University of Oxford, Oxford OX1 1NF, United Kingdom

4. Centre For Health Policy, University of Melbourne, Parkville, VIC, 3010, Australia

We appreciate the thoughtful comments by Iman Nurjaman regarding our recent paper on inequality in COVID-19 vaccine acceptance and uptake [1], and thank them for continuing the discourse on this important issue. Their reflections on institutional trust and digital access are well taken, and align with a broader narrative on moving beyond single-variable ranking measures in vaccine equity research [2].

In previous work on access during the COVID-19 pandemic [3], we found that (income-related) inequalities in digital access were most pronounced among the lower-income countries in our sample; supporting the authors' observation of underrepresentation in lower income groups on digital tools, including those used in healthcare. We also acknowledge that the digital mode of collection may have biased data collection, particularly in digitally excluded groups.

With respect to expanding the analytical framework in this study, Iman Nurjaman suggests including a wider variable set (e.g., institutional trust) in decomposition models, and conducting mixed-mode data collection.

We fully agree that institutional trust is an important factor in vaccine uptake. In fact, using the first wave of data from this study, we previously found that, whilst the key predictors of moderate hesitancy were age and gender, lack of trust was the most consistent predictor, across countries, of extreme vaccine hesitancy [4]. We therefore echo Iman Nurjaman's call for further research into the role of trust in vaccine hesitancy and how trust can be improved, across diverse countries and institutional settings. However, in our decomposition analysis in this study, we took a conservative, parsimonious approach to quantifying the contributions to socioeconomic inequality in vaccine hesitancy, focusing mainly on standard, easily defined population subgroups, such as gender, education and marital status.

Trust in healthcare professionals and institutions is likely associated with many, if not all, of these variables. Including trust in our decomposition would have been likely to "soak up" part of the inequality transmitted through those pathways, yielding misleadingly low contributions from important standard socioeconomic groupings, from which we felt it was

important to quantify the contribution. Expanding vaccine-equity frameworks to encompass contemporary challenges is a valuable endeavour, and we hope that this exchange contributes to refining methodological foundations and advancing research avenues in the area.

[1] Abel, Z.D.V., Roope, L.S.J., Duch, R., Cole, S., and P. M. Clarke, "Inequality in COVID-19 vaccine acceptance and uptake: A repeated cross-sectional analysis of COVID vaccine acceptance and uptake in 13 countries," *Health Policy (New York)*, vol. 153, no. June 2024, p. 105251, 2025, doi: 10.1016/j.healthpol.2025.105251.

[2] Patenaude BN, Sriudomporn S, Odihi D, Mak J, de Broucker G. "Comparing multivariate with wealth-based inequity in vaccination coverage in 56 countries: toward a better measure of equity in vaccination coverage," *Vaccines (Basel)* 2023; 11(3):536. <https://doi.org/10.3390/vaccines11030536>.

[3] Abel, Z.D.V., Roope, L.S.J., Duch, R., and P.M. Clarke. "Access to healthcare services during the COVID-19 pandemic: a cross-sectional analysis of income and user-access across 16 economically diverse countries," *BMC Public Health* **24**, 2678 (2024). <https://doi.org/10.1186/s12889-024-20147-y>

[4] Candio, P., Violato, M., Clarke, P.M., Duch, R. and Roope, L.S., 2023. Prevalence, predictors and reasons for COVID-19 vaccine hesitancy: Results of a global online survey. *Health Policy*, 137, p.104895. <https://doi.org/10.1016/j.healthpol.2023.104895>